

Applicant: Andreas HUEHSAM
Docket No. R.305860
Preliminary Amdt.

AMENDMENTS TO THE SPECIFICATION:

Page 1, please add the following new paragraphs before paragraph [0001]:

[0000.2] CROSS-REFERENCE TO RELATED APPLICATIONS

[0000.4] This application is a 35 USC 371 application of PCT/DE 2004/001023 filed on May 15, 2004.

[0000.6] BACKGROUND OF THE INVENTION

Please replace paragraph [0001] with the following amended paragraph:

[0001] ~~Prior Art~~ **Field of the Invention**

Please replace paragraph [0002] with the following amended paragraph:

[0002] The invention is ~~based on a~~ directed to an improved method for applying an electrical insulation to a ferromagnetic body, provided with axial slots for receiving an electrical winding, of a primary element of an electrical machine~~[[,]]~~ in particular to a slotted armature body of an armature of a direct-current motor~~[[,]]~~ as generically defined by the preamble to claim 1.

Please add the following new paragraph after paragraph [0002]:

[0002.5] Description of the Prior Art

Please replace paragraph [0003] with the following amended paragraph:

[0003] A slotted armature body of an armature of a direct-current motor~~[[,]]~~ of the kind shown for instance in plan view in Fig. 2, comprises type with which this invention is concerned includes a plurality of profiled laminations ~~[[11]]~~, which are lined up axially one after the other and joined to make a lamination packet~~[[.]]~~ which The armature body ~~[[10]]~~ is press-fitted onto an armature shaft ~~[[13]]~~. The armature body ~~[[10]]~~ has a plurality of axial

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slots [[14]], which are open to both face ends of the cylindrical armature body 10 and which discharge at a slot opening [[141]] in the cylindrical surface of the armature body [[10]]. An armature winding in the form of coils is wound into the axial slots [[14]]. The coils are wound from an insulated coil wire, such as painted copper wire. Before the armature winding is wound in place, the axial slots [[14]] and also the face ends of the armature body [[10]] are provided with an electrical insulation 15, which is shown in Fig. 1 for only one axial slot 14.

Please replace paragraph [0004] with the following amended paragraph:

[0004] In the possible methods for applying such an insulation to the slots [[15]], coating the armature body [[10]] with electrostatically charged plastic powder has proven itself as the most economical method, with the additional advantage that the slot cross section is reduced only insignificantly by the insulation [[15]], and a quite high slot fill factor for the armature winding can thus be achieved.

Page 2, please replace paragraph [0005] with the following amended paragraph:

[0005] In a known method[[,]] ~~shown as a flow chart in Fig. 1~~, for applying the electrical insulation [[15]] to the armature body [[10]] by means of electrostatic powder coating, the armature body [[10]] already pressed together with the armature shaft [[13]] is precleaned[[,]] to eliminate contamination occurring in manufacture; masked at [[both]] points that are not to be coated, such as the armature shaft [[13]]; and coated in a powder fluid bath with electrostatically charged plastic powder. The masks additionally take on a clamping function for fixing the armature body on a conveyor system that passes through the fluid bath, and for this purpose the armature bodies have to be repositioned on the conveyor system after

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masking. The bottom of the fluid bath comprises a porous plate, through which ionized or in other words electrically charged compressed air flows, which electrostatically charges the powder uniformly and fluidizes the powder, so that the powder behaves like a fluid. The electrostatically charged powder particles, because of the charges that are opposite the force of attraction, settle on the armature bodies being guided through the fluid bath and remain stuck to them. The thus-coated armature bodies are cleaned outside the fluid bath in a further method step, to remove powder adhering to the cylindrical surface of the armature bodies. Next, the cleaned armature bodies are delivered to a heating section, in which by heat input, the powder layer is melted and fired and hardened. The armature bodies are repositioned again and unmasked in a further method step. The unmasked armature bodies are then cooled down in a **chilling** **cooling** zone. The removed masks are delivered to a mask cleaner, and with the cleaned masks, new, precleaned armature bodies are masked. The cooled-down armature bodies [[10]] are removed from the processing system and delivered to an automatic winder.

Page 3, please replace paragraph [0007] with the following amended paragraph:

[0007] ~~Summary of the Invention~~ **SUMMARY OF THE INVENTION**

Please replace paragraph [0008] with the following amended paragraph:

[0008] The method of the invention ~~having the characteristics of claim 1~~ has the advantage that it can be implemented much more economically than the known ~~method~~ **methods** and assures effective powder coating with reliable slot insulation. The components required for performing the method are standard components conventionally available on the market, of

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the kind used for instance in painting automobiles or in other painting systems for decorative surfaces and are available worldwide. These standard components require only little investment expense and are easy to maintain, so that functional parts can be quickly replaced and down times for maintenance and repair are reduced to a minimum. In the event of malfunctions or an inadequate throughput of material, the powder stream can immediately shut down, and thus the use of powder can be optimized.

Page 5, please delete paragraph [0011].

Please replace paragraph [0012] with the following amended paragraph:

[0012] Drawing **BRIEF DESCRIPTION OF THE DRAWINGS**

Please replace paragraph [0013] with the following amended paragraph:

[0013] The invention is described in further detail below, with reference to the drawings, in which: in terms of an exemplary embodiment shown in the drawing. Shown are:

Please replace paragraph [0014] with the following amended paragraph:

[0014] Fig. 1[[],] is a flow chart of a method for applying an insulation to armature bodies for electrical machines in the prior art;

Page 6, please replace paragraph [0015] with the following amended paragraph:

[0015] Fig. 2[[],] is a cross section through an armature body pressed onto an armature shaft;

Please replace paragraph [0016] with the following amended paragraph:

[0016] Fig. 3[[],] is a flow chart of the method of the invention for coating armature bodies with insulation;

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Please replace paragraph [0017] with the following amended paragraph:

[0017] Fig. 4, a schematic illustration of a conveyor system for the passage of armature bodies through the coating process **of the invention**;

Please replace paragraph [0018] with the following amended paragraph:

[0018] Fig. 5, a block circuit diagram of a system for electrostatic powder spray-coating[[:]]
suitable for use in the method of the invention; and

Please replace paragraph [0020] with the following amended paragraph:

[0020] **Description of the Exemplary Embodiment**

DESCRIPTION OF THE PREFERRED EMBODIMENT

Please replace paragraph [0021] with the following amended paragraph:

[0021] The method for applying an electrical insulation to a ferromagnetic body, provided with axial slots for receiving an electrical winding, of a primary element or in other words a stator or a rotor of an electrical machine will be described in terms of a slotted armature body 10 of an armature of a direct-current motor. The armature body 10, which can be seen end-on in Fig. 2, comprises a plurality of profiled laminations 11, which are lined up one after the other to form a so-called lamination packet and are axially joined firmly together. Instead of a profiled lamination packet, the armature body 10 may be embodied as a solid cylinder of soft magnetic composite material, or SMC (Soft Magnetic Composite) material. The armature body 10 is provided in a known manner with a plurality of axial slots 14, located equidistantly over the circumference of the body, for receiving an armature winding.

Page 8, please replace paragraph [0024] with the following amended paragraph:

[0024] In Fig. 5, the components required for performing the "coating" method step 24 are shown in a block circuit diagram. The spraying of the electrostatically charged plastic powder onto the grounded armature bodies 10 is done in a closed spraying chamber 31, through which the conveyor belt 22 passes with its upper, delivery section. The flow of parts, that is, the passage of the armature bodies 10 through the chamber 31, is represented by the arrow 20. The grounding of the armature bodies 10 is effected via the conveyor belt 22, which has clamping devices 23 and is in turn grounded. A spray apparatus 32 is integrated with the chamber 31 and via at least one spray location 33, by means of compressed air, sprays a metered quantity of powder onto each armature body 10. To that end, a so-called spray gun or corona gun is disposed at each spray location 33, and its spraying direction is aimed at the particular armature body 10 moving past it. Such spray guns are available on the market as standard components and are used for instance in painting decorative surfaces. The spray guns are connected to a voltage potential of approximately 70 kV for the sake of electrically charging the powder particles. The quantity of powder sprayed per armature body 10 is metered such that a layer thickness of preferably 1.0 to 1.5 mm is created on the armature body 10. A coarse plastic powder is used, whose powder particles have a mean diameter of more than 150 μm . These heavy powder particles improve the overcoming of the Faraday effect mentioned ~~at the outset~~ above and lead to an improved, uniform coating of the slot walls of the axial slots 14 in the armature body 10. Powder that does not reach the armature bodies 10 is delivered, via a so-called "overspray" line 34, to a powder bin 36, in which the compressed air laden with powder particles is passed through filters and flows out

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into the environment as waste air (arrow 37). The powder particles trapped by the filters drop back into a powder supply stored in the powder bin 36.

Page 9, please replace paragraph [0026] with the following amended paragraph:

[0026] Fig. 6 schematically shows the combination of the spraying chamber 31 with the powder bin 36 in a common housing 42, as a compact integrated version of a coating chamber. The powder-laden air stream originating at the spray location s 33 or spray guns is carried, after flowing past the armature bodies 10, directly into the powder bin 36, in which the air can pass via filters 39 as waste air (arrow 37) into the environment. The powder residues deposited [[in]] on the filter 39 drop onto the powder supply stored in an indented a recessed bottom of the powder bin 36. From there, powder is aspirated by the pneumatic powder conveyor 38 and returned to the spray locations 33 via the metering device 35. For the sake of simplicity, in Fig. 4 only two spray locations 33 and in Fig. 5 only one spray location 33 are shown. The number of spray locations 33 in the spray apparatus 32, however, is arbitrary and is adapted to the desired throughput speed of the armature bodies 10 through the chamber 31.

Page 10, please add the following new paragraph after paragraph [0026]:

[0027] The foregoing relates to a preferred exemplary embodiment of the invention, it being understood that other variants and embodiments thereof are possible within the spirit and scope of the invention, the latter being defined by the appended claims.